

# Section 4.1

## Atomic Theory and Bonding

### Check Your Understanding

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#### Checking Concepts

- (a) What is one property that protons and neutrons have in common?

(b) What is one property that is different for protons and neutrons?
- Which two subatomic particles are nearly equal in mass?
- Which subatomic particle is nearly equal to the masses of the other two subatomic particles added together?
- A bucket full of water has both mass and volume. Referring to the subatomic particles, explain what accounts for most of the:

(a) mass of the water

(b) volume of the water
- Explain how an atom is composed of charged particles yet can have an overall charge of zero.
- (a) What is the value of the nuclear charge on a neon atom?

(b) How is the nuclear charge determined?

7. Complete the following chart.

	Element	Atomic Number	Number of Protons	Number of Electrons
(a)	Pb	82		
(b)			8	
(c)				30
(d)	Fe			
(e)		47		
(f)				17

8. For each of Cs, S, Kr, C, Fe, and Hg, name its:

(a) period

(b) group

9. List four chemical family names, working from left to right across the periodic table.

## Understanding Key Ideas

10. Name the subatomic particle(s) that best fit each of the following descriptions.

(a) has a negative charge

(b) has an electric charge

(c) surrounds the nucleus in a regular pattern

(d) has an electric charge of zero

(e) is present in the nucleus

(f) The number of this particle is always the same as the atomic number.

11. How is a covalent compound different from an ionic compound?

12. Compare a Bohr diagram and a Lewis diagram. Explain how they are:

(a) similar

(b) different

13. Draw Bohr diagrams for:

(a) diatomic molecules  $H_2$  and  $F_2$

(b) covalent compounds  $H_2O$  and  $HCl$

(c) ionic compounds KF and  $\text{Li}_2\text{O}$

14. Draw Lewis diagrams for:

(a) diatomic molecules  $\text{H}_2$  and  $\text{F}_2$

(b) covalent compounds  $\text{H}_2\text{O}$  and HCl

(c) ionic compounds NaF,  $\text{BeCl}_2$  and  $\text{Li}_2\text{O}$

## ***Pause and Reflect***

Think back over the information you have learned about atoms in this section. Illustrate and explain your understanding of the current model for the atom. How have your ideas changed from your earlier understanding of the atom?